

PIEDMONT ACIDIC GLADE

Concept: Piedmont Acidic Glades are open, generally grassy, heterogeneous woodlands or savannas of shallow soils over irregular bedrock (not exfoliated granitic rocks), not showing any circumneutral or basic influence in their flora. These are generally moderately to steeply sloping and on dry slope aspects. They have more vegetation cover, especially in the herb layer, than the sparsely vegetated cliff communities but are prevented from forming a closed forest by shallow soil and associated xeric conditions. Vegetation is generally patchy and open but often contains substantial tree cover as well as herb- or low-shrub-dominated areas. Open rock areas are limited.

Distinguishing Features: All the glade communities are distinguished from forest communities by having a persistently open tree canopy, ranging from woodland structure to sparser. The combination of tree species, generally *Quercus montana* along with *Quercus stellata* or xerophytic pines, is distinctive. This community is distinguished from Xeric Piedmont Slope Woodland by having more open canopy, shallow soil, and greater influence of rock.

Piedmont Acidic Glades are distinguished from Piedmont Cliff, Granitic Flatrock, and Low Elevation Rocky Summit by having soil with substantial herbaceous or shrub cover over most of the area and limited areas of bare rock. Plants characteristic of bare rock, such as *Phemeranthus teretifolius* (= *Talinum teretifolius*), *Crotonopsis elliptica*, *Selaginella rupestris*, and crustose lichens, may be present but are scarce and limited to the small areas of open rock outcrop.

Piedmont Acidic Glades are distinguished from Piedmont Basic Glades by lacking flora characteristic of circumneutral or basic sites. Generally, the undergrowth is dominated either by grasses or by short clonal shrubs such as *Vaccinium pallidum* or *Gaylussacia baccata*. Grassy areas are generally dominated by *Schizachyrium scoparium* but may include *Danthonia spicata*, *Piptochaetium avenaceum*, *Andropogon gerardii*, *Andropogon ternarius*, *Andropogon gyrans*, and *Sorghastrum nutans*. Species characteristic of less acidic soils, such as *Cercis canadensis*, *Rhus aromatica*, *Fraxinus americana*, *Cheilanthes tomentosa*, or *Aquilegia canadensis* are absent or extremely scarce. Species such as *Vaccinium arboreum*, *Chionanthus virginicus*, and *Carya* spp. may be present but occur in smaller proportions than in basic glades.

Synonyms: *Quercus prinus* - *Quercus stellata* - (*Pinus virginiana*, *Pinus echinata*) / *Vaccinium pallidum* / *Schizachyrium scoparium* Woodland (CEGL004910).

Ecological Systems: Southern Piedmont Glade and Barrens CES202.328).

Sites: Piedmont Acidic Glades usually occur on moderate to steep slopes that face south or west, but they may occur on other aspects or may be flat. Bedrock is near the surface beneath most of the community, but shallow soil covers most of it. The geologic substrate is generally felsic igneous or metamorphic rocks such as rhyolite, dacite, granite, gneiss, phyllite, or schist, but it can potentially be meta-sedimentary rock.

Soils: Glade soils are shallow, with bedrock near the surface. The soil material includes rock fragments and early weathering products along with organic matter and washed-in material. These soils may consist of shallow mats or deep fill in crevices and are often extremely heterogeneous. They generally represent inclusions in soil map units.

Hydrology: The shallow soils dry quickly between rains and are prone to extreme drought stress. There is a possibility of small seepage patches on the edges, but this appears to be rare.

Vegetation: The vegetation of Piedmont Acidic Glades is usually patchy and heterogeneous; it may range from an open woodland or savanna to nearly treeless. The herb layer is generally the dominant stratum, though a few examples may have limited herb cover and most have small openings with bare rock. *Schizachyrium scoparium* is most often dominant, but *Danthonia spicata*, *Danthonia sericea*, or *Piptochaetium avenaceum* may dominate patches. Other herbs that are at least fairly frequent in the grassy vegetation in CVS plot data or site descriptions include *Dichanthelium depauperatum*, *Andropogon virginicus*, *Tephrosia virginiana*, *Pityopsis graminifolia*, *Coreopsis verticillata*, *Dichanthelium dichotomum*, *Sorghastrum nutans*, *Dichanthelium commutatum*, *Cunila origanoides*, *Oxalis stricta* or *dilennii*, and *Euphorbia pubentissima*. Many other herbs of dry open communities are found at low frequency but may once have been more common, including *Solidago odora*, *Scleria oligantha*, *Scleria ciliaris*, *Ionactis linariifolius*, *Sericocarpus linifolius*, *Yucca flaccida*, *Andropogon gerardii*, *Pteridium latiusculum*, *Parthenium integrifolium*, *Baptisia tinctoria*, *Iris verna*, and *Helianthus divaricatus*. Species of rock outcrops, such as *Krigia virginica*, *Phemeranthus teretifolius*, *Hypericum gentianoides*, and mosses and lichens, are often present with small cover on the embedded open rock. Ruderal species such as *Ambrosia artemisiifolia*, *Conyza canadensis*, and *Andropogon virginicus* are often present, though all but the latter with limited cover.

In the tree canopy, *Quercus montana*, *Pinus virginiana*, or *Pinus echinata* are most constant and most often dominant in both plot data and site descriptions, but *Quercus stellata* may dominate. Other frequent trees that often have moderate cover include *Quercus marilandica*, *Carya pallida*, *Carya glabra*, and *Juniperus virginiana*. Less frequent trees include *Oxydendrum arboreum*, *Nyssa sylvatica*, *Ulmus alata*, *Quercus alba*, *Diospyros virginiana*, *Sassafras albidum*, and other species that may not be characteristic, such as *Acer rubrum*. Shrubs may be sparse or moderately dense in different examples or in patches within a community. *Vaccinium arboreum* and *Vaccinium pallidum* are most frequent, but *Gaylussia baccata* may dominate. Other shrubs may include *Toxicodendron pubescens*, *Vaccinium stamineum*, *Gaylussacia frondosa*, *Hypericum hypericoides*, or *Hypericum stragulum*. Vines, particularly *Muscadinia rotundifolia* or *Smilax glauca* but also occasionally *Gelsemium sempervirens*, may dominate patches.

Range and Abundance: Ranked G2. Examples are scattered in the central Piedmont and could occur in more portions of the Piedmont, but the majority occur in the Uwharrie area and Montgomery, Stanly, and Randolph counties. The equivalent association is uncertainly attributed to South Carolina and Georgia.

Associations and Patterns: Piedmont Acidic Glades occur as small patches. They are surrounded by forest communities, usually Dry Oak–Hickory Forest or Piedmont Monadnock Forest.

Variation: Variants are not defined. There is usually more heterogeneity within examples than there is among examples.

Dynamics: Drought may be an important part of the dynamics of these communities. Drought is more likely to kill trees with limited rooting depth, and periodic mortality may be an important cause of the open structure of these communities. The author has observed a number of cases of substantial tree mortality in glades during droughts which, while fairly severe, did not kill any trees in the adjacent forest. Though less obvious, mortality of tree seedlings in drought may be an even more important contributor to openness. It may take a series of unusually moist years to allow new trees to mature in these communities. Because of these dynamics, tree stands in these communities may be more even aged than typical natural forests, with most trees limited to one or a few cohorts.

Piedmont Acidic Glades, as small patches, would naturally be subject to fire whenever the surrounding forest burned. The irregular vegetation can be expected to lead to heterogeneous fire behavior, but vegetation is continuous enough that most parts would burn. Fire may be an important factor under natural conditions in structuring the vegetation, but some patches in the interior may rarely, perhaps never, burn. Some glades likely have developed heavier tree cover and perhaps become smaller because of fire suppression, but these communities are capable of staying open in the absence of fire.

As with all shallow-rooted trees, wind may cause more disturbance than in a typical deep forest soil, but trees rooted in crevices may be quite well anchored.

Comments: No published literature pertaining to Piedmont Acidic Glades has been identified, but the community is well documented in both plots and site descriptions. As with other glade and barrens communities, it can be difficult to confidently assign plots to them if the vegetation structure and substrate are not recorded in detail.

Quercus prinus - *Quercus stellata* - *Carya glabra* / *Vaccinium arboreum* - *Viburnum rufidulum* Forest (CEGL004416) is a xeric forest association that in some parts of its description sound similar to Piedmont Acidic Glade or to Xeric Piedmont Slope Woodland. It was apparently originally defined based on two CVS plots in the area of greatest development of both of these communities, and the data from the two plots suggest they are transitional between the two.

Rare species:

Invertebrate animals: *Incisalia angustus*.

References: